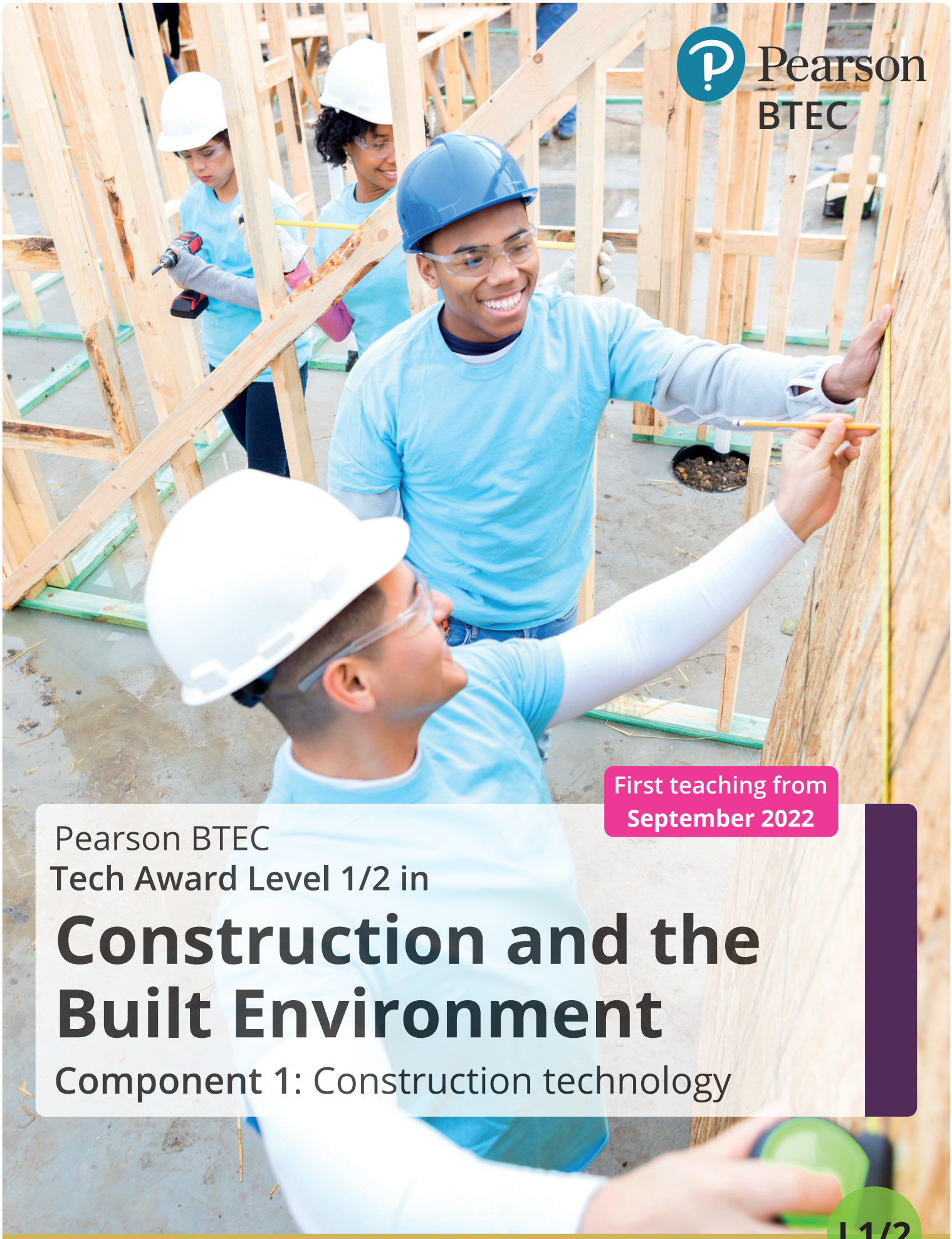

Pearson BTEC

First teaching from September 2022

Pearson BTEC
Tech Award Level 1/2 in

Construction and the Built Environment

Component 1: Construction technology

L1/2

Sample Assessment Materials

First teaching from September 2022

Issue 1

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Contents

Exam paper **1**

Sample mark grid **15**

Please check the examination details below before entering your candidate information

Candidate surname	Other names

Centre Number | | | | | | |

Learner Registration Number | | | | | | | | | |

Pearson BTEC Tech Award in Construction and the Built Environment

Sample assessment materials for first teaching September 2022

Time 1 hour 30 minutes

Paper reference **XXXXX/XX**

Construction and the Built Environment

COMPONENT 1: Construction Technology

You do not need any other materials.

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and learner registration number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*

Information

- The total mark for this paper is 60.
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

S72503A

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1/1

S 7 2 5 0 3 A 0 1 1 3

Pearson

Answer ALL questions. Write your answers in the spaces provided.

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

1 Which **one** of these methods would be used for the purpose of slowing down the spread of fire in a building?

- ☒ **A** Fire compartments
- ☒ **B** Refuge area
- ☒ **C** Smoke detectors
- ☒ **D** Fire alarms

(Total for Question 1 = 1 mark)

2 Which **two** of these components would be used for the purpose of providing sound insulation?

- ☒ **A** Tile battens
- ☒ **B** Metal studs
- ☒ **C** Plasterboard layers
- ☒ **D** Flooring mats
- ☒ **E** Ventilation ducts

(Total for Question 2 = 2 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

3 Different materials and components are selected to deliver different performance requirements.

Draw a line to match each performance requirement to the material/component that will achieve the performance.

Each performance requirement links to only one material/component.

Performance requirement	Material/Component
	Trench blocks
Weather resistance	Sheep's wool
	Intumescent paint
Thermal insulation	
	Fire blankets
	Lead flashings

(Total for Question 3 = 2 marks)

DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA

4 State **two** components of a wall opening.

1 .....

2 .....

(Total for Question 4 = 2 marks)

5 State **two** types of work that can be classified as commercial construction.

1 .....

2 .....

(Total for Question 5 = 2 marks)

6 State **two** types of welfare facility that should be shown on a site layout plan.

1 .....

2 .....

(Total for Question 6 = 2 marks)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

7 Diagram 1 shows a sub-structure detail of a suspended timber ground floor.

Label the components of the suspended timber ground floor shown in Diagram 1.

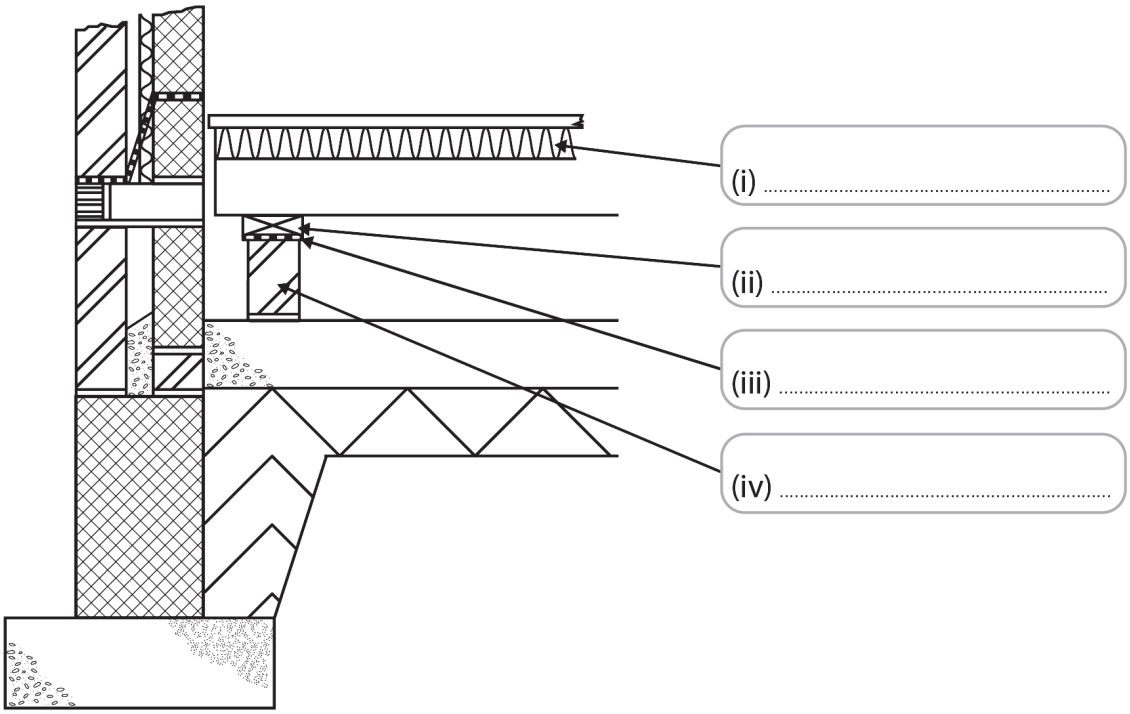

Diagram 1

(Total for Question 7 = 4 marks)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

8 Draw and label a cross section through a beam and block ground floor.

Your drawing must identify each of the components used and the correct placement of each component.

(Total for Question 8 = 4 marks)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

9 Some of the benefits of a flat roof are that it is cheaper and easier to construct.

Explain **one** other benefit of a flat roof construction form.

(Total for Question 9 = 2 marks)

10 Explain **two** features of a brick wall that would help protect a building from wind and rain.

1

2

(Total for Question 10 = 4 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

11 Discuss the factors that a developer should consider before deciding to build on a brownfield site.

(Total for Question 11 = 6 marks)

12 State **one** type of load that buildings are designed to resist.

(Total for Question 12 = 1 mark)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

13 State **two** types of underground utility services.

1 .....

2 .....

(Total for Question 13 = 2 marks)

14 Which **two** types of work are classified as civil engineering construction?

- ☒ **A** Housing
- ☒ **B** Facilities management
- ☒ **C** Bridges
- ☒ **D** Building maintenance
- ☒ **E** Railways

(Total for Question 14 = 2 marks)

15 State **two** functions of a building's foundation.

1 .....

2 .....

(Total for Question 15 = 2 marks)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

16 Explain **one** type of flood defence method that would protect a community from flooding.

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(Total for Question 16 = 2 marks)

17 Explain **two** reasons why walls are constructed of high density concrete blocks.

1 .....

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.....

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2 .....

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(Total for Question 17 = 4 marks)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

18 A developer is planning to construct a series of buildings with flat roofs

Some of the benefits of using mineral felt to finish the flat roofs is that it is potentially quicker, cheaper and easier to install.

Explain **two** other benefits of using mineral felt for the flat roofs.

1 .....

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.....

.....

2 .....

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(Total for Question 18 = 4 marks)

19 Explain **one** reason why a raft foundation may be selected for a building project.

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(Total for Question 19 = 3 marks)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

20 Explain **one** benefit of using engineered timber joists for the floors of a building project.

(Total for Question 20 = 3 marks)

21 A housing developer is going to construct new houses on a plot of land.

Discuss the suitability of timber frame construction for this housing development.

(6)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

(Total for Question 21 = 6 marks)

TOTAL FOR PAPER = 60 MARKS

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Component 1: Construction Technology – sample mark scheme

General marking guidance

- All learners must receive the same treatment. Examiners must mark the first learner in exactly the same way as they mark the last.
- Mark grids should be applied positively. Learners must be rewarded for what they have shown they can do rather than be penalised for omissions.
- Examiners should mark according to the mark grid, not according to their perception of where the grade boundaries may lie.
- All marks on the mark grid should be used appropriately.
- All the marks on the mark grid are designed to be awarded. Examiners should always award full marks if deserved. Examiners should also be prepared to award zero marks if the learner's response is not rewardable according to the mark grid.
- Where judgement is required, a mark grid will provide the principles by which marks will be awarded.
- When examiners are in doubt regarding the application of the mark grid to a learner's response, a senior examiner should be consulted.

Points-Based Mark Scheme Guidance

Points-based mark schemes are made up of:

1. Mark scheme rubric:

   A mark scheme rubric instructs an examiner as to how each mark is awarded.
2. Example responses:

   These demonstrate the type of acceptable responses that a learner might provide and where each mark is awarded.
3. Additional marking guidance:

   This informs examiners about any parameters which should be applied, for example 'accept any other appropriate/alternative responses'.

Applying the points-based mark scheme guidance

Examiners should follow the mark scheme rubric and use the example responses as a guide for the relevance and expectation of the responses. Learners must be credited for any appropriate response. Should learners provide answers that meet the rubric but in an alternative order, credit should be given.

Levels-Based Mark Scheme Guidance

Levels-based mark schemes (LBMS) have been designed to assess learners' work holistically. They consist of two parts:

1. Indicative content:

   Indicative content reflects content-related points that a learner might make but is not an exhaustive list. Nor is it a model answer. Learners may make some or none of the points included in the indicative content as its purpose is as a guide for the relevance and expectation of the responses. Learners must be credited for any appropriate response.

2. Levels-based descriptors:

   Each level is made up of a number of traits which when combined together articulate the quality of response that a learner needs to demonstrate. The traits progress across the levels to demonstrate the different expectations of each level. When using a levels-based mark scheme, the 'best fit' approach should be used.

Applying the levels-based descriptors

Examiners should take a 'best fit' approach to determining the mark.

- Examiners should first make a holistic judgement on which level most closely matches the learner's response. Learners will be placed in the level that best describes their answer. Answers can display characteristics from more than one level, and where this happens markers must use any additional guidance (for example weighting of traits) and their professional judgement to decide which level is most appropriate.
- The mark awarded within the level will be decided based on the quality of the answer and will be modified according to how securely all traits are displayed at that level:
  - marks will be awarded at the top of that level if the learner has evidenced each of the descriptor traits securely.
  - where the response does not securely meet all traits, the marks should be awarded based on how closely the descriptor has been met.

Question Number	Answer	Mark
1	Award **one** mark for the correct response. **A** – Fire compartments	(1)

Question Number	Answer	Mark
2	Award **one** mark for each correct response, up to a maximum of two marks. **C** – Plasterboard layers **D** – Flooring mats	(1)

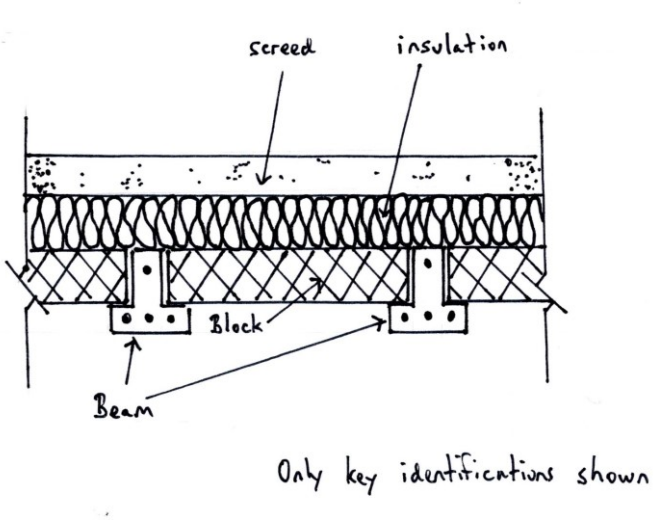
Question Number	Answer	Mark
3	Award **one** mark for each correctly matched line up to a maximum of **two** marks: Weather resistance – Lead flashings Thermal insulation – Sheep's wool	(2)

Question Number	Answer	Mark
4	Award **one** mark for any of the following up to a maximum of **two** marks. • Lintel • Sill • Window • Door • Threshold • Damp-proof course (DPC) • Cavity trays • Cavity closers • Weepholes Accept any other appropriate response.	(2)

Question Number	Answer	Mark
5	Award **one** mark for each stated type of commercial construction project, up to a maximum of **two** marks from: • Banks • Offices • Business parks Accept any other appropriate response.	(2)

Question Number	Answer	Mark
6	Award **one** mark for each correctly stated type of welfare facility that should be shown on a site layout plan, up to a maximum of **two** marks. • First aid [point/provision] (1) • Mess room/canteen (1) • [Drying/changing] room (1) • Toilets (1) Accept any other appropriate response.	(2)

Question Number	Answer	Mark
7	Award **one** mark for each correct label, up to a maximum of **four** marks. Label (a) insulation Label (b) wall plate/timber wall plate/sawn timber Label (c) damp-proof course/DPC Label (d) sleeper wall/honeycomb sleeper wall/brick Accept any other appropriate response. Do **not** accept 'wall' or 'timber' without the correct qualification of the type of wall or timber.	(4)

Question Number	Answer	Mark
8	Award **one** mark for each correctly placed and labelled component up to a maximum of **four** marks. • Beam • Block • Insulation • Screed Example of an acceptable sketch with appropriate labelling:  	(4)

Question Number	Answer	Mark
9	Award **one** mark for a correct advantage and **one** mark for a justification of why flat roof construction is advantageous, up to a maximum of **two** marks. • Potential of the creation of a terrace (1) that can be used for outdoor activities/recreational usage (1). • There is less impact on the neighbours' view as the roof line is lower (1), potentially reducing conflict or planning issues expressed by neighbours (1). • Easier to access (1), therefore maintenance of the roof is easier for the householder (1). Accept any other appropriate response.	(2)

Question Number	Answer	Mark
10	Award **one** mark for each correct feature that protects a brick wall from wind and rain, and **one** mark for a justification of how each feature protects against wind and rain, up to a maximum of **four** marks. • A tooled or weathered joint (1) because it does not hold water in the joint (1). • High-density bricks (1) because they [have less air pockets/will reduce chances of passing moisture] (1). • A smooth-faced brick (1) because it will shed water better/reduce water uptake (1). • Use of cement mortar (1) because it is less porous than other materials which could be used (1). Accept any other appropriate response. Do **not** accept: • Projecting eaves, as they are not a feature of a wall. • Any remedial actions or finishes such as silicon sealants, render or masonry paints/treatments.	(4)

Question Number	Answer	Mark
11	Responses will be credited according to the learner's demonstration of knowledge and understanding of the material, using the indicative content and level descriptors below. The indicative content that follows is not prescriptive. Responses may cover some or all indicative content, but learners should be rewarded for other relevant responses. **Indicative content**: • The site may need to be decontaminated as part of the development work, improving safety for local residents. This may increase the cost of the development. • May require demolition of existing buildings and due to their age, they may contain hazardous materials such as asbestos. This may make the development more expensive through costs to survey the site to check for such materials and to remove any materials that are found. • Regeneration of the brownfield site means that the local authority is more likely to grant the property developer planning permission/improved social benefits. • Existing infrastructure may be in place, therefore reducing initial infrastructure start-up costs. However, this may need to be changed/repurposed/improved, leading to higher costs. • It may be possible to utilise existing services connections, which could potentially reduce the cost of bringing new services onto the site. • There is an opportunity for using reclaimed/recycled/reused materials, reducing the need for new materials.	(6)

Level	Mark	Descriptor
Level 0	0	• No rewardable content
Level 1	1–2	• Demonstrates isolated knowledge and understanding, there will be major gaps or omissions • Few of the points made will be relevant to the context in the question • Limited discussion which contains generic assertions rather than considering different aspects and the relationship between them
Level 2	3–4	• Demonstrates some accurate knowledge and understanding, with only minor gaps or omissions • Some of the points made will be relevant to the context in the question, but the link will not always be clear • Displays a partially developed discussion which considers some different aspects and some consideration of how they interrelate, but not always in a sustained way
Level 3	5–6	• Demonstrates mostly accurate and thorough/detailed knowledge and understanding • Most of the points made will be relevant to the context in the question, and there will be clear links

Level	Mark	Descriptor
		• Displays a well-developed and logical discussion which clearly considers a range of different aspects and considers how they interrelate, in a sustained way

Question Number	Answer	Mark
12	Award **one** mark for a correctly stated type of load: • Self-weight • Imposed/static • Dynamic/live • Snow • Wind • Point • Uniformly distributed Accept any other appropriate response.	(1)

Question Number	Answer	Mark
13	Award **one** mark for each correctly stated type of underground utility service, up to a maximum of **two** marks from: • Gas • Water (supply) • Electricity • Communications • Drainage	(2)

Question Number	Answer	Mark
14	Award **one** mark for each correct response, up to a maximum of **two** marks. • **C** – Bridges • **E** – Railways	(2)

Question Number	Answer	Mark
15	Award **one** mark for each correctly stated function, up to a maximum of **two** marks. • To safely transmit the loads of the building to the subsoil (1) • To provide a stable base to build on. (1) • To allow settlement within acceptable limits. (1) • To create a level surface on which to build. (1) Accept any other appropriate response.	(2)

Question Number	Answer	Mark
16	Award **one** mark for a correct type of flood defence, and **one** mark for a justification of why the flood defence would protect the community (1), up to a maximum of **two** marks. • Build tidal [defences/barriers] (1) because these can be closed when tides are high to protect towns on tidal rivers (1). • Building of river defences (1) because these prevent river banks being breached during periods of high rainfall (1). • Coastal defences/sea walls (1) because these redirect the waves made by a storm surge back into the ocean (1). Accept any other appropriate response.	(2)

Question Number	Answer	Mark
17	Award **one** mark for each identification of a reason why high-density concrete blocks are used to build walls, and **one** mark for each justification of the reasons given, up to a maximum of **four** marks. • Partition made from concrete blocks allow privacy (1) because they have good sound-reduction properties/provide a visual barrier for occupants (1). • They can be fair faced (1) to accept direct decoration/natural finish (1). • They have good compressive strength (1), making them suitable for load-bearing walls (1). • They have high levels of thermal mass (1), allowing the internal temperature to remain stable (1). • They are durable (1), allowing the building structure to have a long service life (1). • They are tough (1), meaning they will not fracture if they receive impact (1). • The blocks are versatile (1), allowing them to be used for all parts of the building (1). • They are moisture resistant (1) and therefore stable in areas of high moisture content (1). Accept any other relevant phrasing/wording.	(4)

Question Number	Answer	Mark
18	Award **one** mark for each correct benefit of using roofing felt for the construction of a flat roof, and **one** mark for each justification of why it is a benefit, up to a maximum of **four** marks. • Felt is not affected by ultra violet (UV) rays/high temperature (1) because the mineral coating reflects the UV rays/high temperature (1). • It does not require a layer of mineral chippings (1) because the mineral is already attached to/embedded into the felt (1). • It can be installed in almost any weather conditions (1) because the bonding is not affected by moisture (1). Accept any other appropriate response. Do **not** accept: • It is [quicker/cheaper/easier] to install.	(4)

Question Number	Answer	Mark
19	Award **one** mark for a correct benefit of using a raft foundation for a building project, **one** mark for a justification of the benefit, and **one** mark for an expansion of the justification, up to a maximum of **three** marks. • Rafts will prevent differential settlement (1) by allowing the building to act as one settlement unit (1) because [soft spots/voids] may be present in the natural ground (1). • Raft foundations will more readily compensate for [ground shrinkage/heave] (1) by allowing the building to act as one settlement unit (1) that could result because of changes to the moisture content of the soil (1). • Raft foundations will minimise building settlement (1) because a raft foundation will spread the load over a larger area (1) by reducing the effects of weak subsoil (1). • Raft foundations can be an economical form of construction (1) due to their combination of foundation and floor slab (1), so reducing labour and material costs (1). Accept any other appropriate response. Do **not** accept: • Raft foundations provide a working platform.	(3)

Question Number	Answer	Mark
20	Award **one** mark for a correct benefit of using engineered timber joists when constructing the upper floors of a building project, **one** mark for a justification of the benefit, and **one** mark for an expansion of the justification, up to a maximum of **three** marks. • Engineered timber joists allow the design of buildings with wide, uninterrupted floor space (1) because they allow for longer structural spans (1) as a result of reducing the need for intermediate support (1). • Engineered timber joists give greater design flexibility (1) because they reduce the building loads (1) as a result of their high strength-to-weight ratio (1). • Quicker form of construction (1) as they are lighter (1), making them easier to handle (1). • Less waste produced on site (1) as they are fabricated off site (1) and are made to measure, with no site cutting needed (1). Accept any other appropriate response.	(3)

Question Number	Answer	Mark
21	Responses will be credited according to the learner's demonstration of knowledge and understanding of the material, using the indicative content and level descriptors below. The indicative content that follows is not prescriptive. Responses may cover some or all indicative content, but learners should be rewarded for other relevant responses. The learner's response should include the factors that may influence the developer's choice of structural form. A key impact is the housing which makes standardised systems beneficial. The learner could discuss the increased speed of erection of timber frame forms, linked to meeting housing demands or a quicker return on the investment of the money invested by the developer and reduced time on site, resulting in less impact on the natural environment. The learner's discussion may include some of the points listed as to why the developer may prefer a timber frame form. **Timber frame** Advantages: • Can use off-the-shelf designs for different types of dwelling. • Standardised layout results in economies of scale and lower cost of production in the factory production of the timber frames. • Roofs can be constructed at ground level prior to delivery of the timber frame, thus saving time and reducing the need to work at height. • Internal trades can start immediately while the external envelope is being completed, which allows concurrent working and a reduced time on site which reduces environmental impact. • Reduction in drying time as no wet internal finishes are used and it saves energy used in drying and dehumidification. • Quicker overall completion time allows earlier recovery of displaced environmental features. • More energy efficient than brick cavity wall when constructed to current standards as high standards of insulation are easily incorporated into the structure. • Variety of external finishes can be applied, allowing the choice of sustainable solutions such as cedar cladding. • Timber frame is a sustainable form of construction because renewable materials are widely used and the impact on the natural environment is lowered. • Developer could be looking at reducing the carbon footprint, which would be attractive to environmentally-conscious buyers. Disadvantages: • Lead time could negate the time advantage if bespoke designs are required. • High levels of quality control are required. • Less public confidence in this structural form, which could reduce demand. • Usually it still requires some form of external applied cladding, which might be traditional brickwork requiring skilled labour. • Fire stopping is required to prevent the potential spread of fire within the cavity.	(6)

	• Requires continuous internal vapour barrier to protect the frame from interstitial condensation	

Level	Mark	Descriptor
Level 0	0	• No rewardable content
Level 1	1–2	• Demonstrates isolated knowledge and understanding, there will be major gaps or omissions • Few of the points made will be relevant to the context in the question • Limited discussion which contains generic assertions rather than considering different aspects and the relationship between them
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